



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/692,999	10/23/2003	Robert R. Rice	NG(ST)7617	9334

26294 7590 08/20/2007
TAROLLI, SUNDHEIM, COVELL & TUMMINO L.L.P.
1300 EAST NINTH STREET, SUITE 1700
CLEVEVLAND, OH 44114

EXAMINER

ALLISON, ANDRAE S

ART UNIT	PAPER NUMBER
----------	--------------

2624

MAIL DATE	DELIVERY MODE
-----------	---------------

08/20/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/692,999

Applicant(s)

RICE ET AL.

Examiner

Andrae S. Allison

Art Unit

2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on RCE filed on July 6, 2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12, 14-16 and 18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-12, 14-16 and 18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application
- ☐ Other: _____

DETAILED ACTION

1. The Office Action has been made issued in response to RCE filed July 6, 2007. Claims 1-11 and 13-18 are pending. Applicant amendments have overcome the previous rejection, however upon review of the prior art, a new ground of rejection is presented.

Response to Rejection Arguments

In response to Applicant's argument on page 7-9 that Stirbl fail to disclose some of the limitations of the claims, the Examiner agrees. However, upon review of prior art a new ground of rejection is presented.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 5, 6, 8, 9, 11, 14-16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Black et al (US Patent No.: 5,774, 591) in view of Pantic (NPL document titled "Expert system for automatic analysis of facial expression") further in view of Reilly (Application of Face and Gesture Recognition for Human-Computer Interaction).

As to claim 1, Black discloses a method for sensing selected emotions (e.g. happiness; column 10, line 64) in a human subject (human face; column 4, line 26). Black teaches generating an image of substantially all of the face of a human subject (40, Fig 2). Black also teaches processing the image to identify movements (determine image motion, column 7, line 34) in selected critical areas of the face (e.g. eye regions; column 7, line 35). Black also teaches comparing the identified movements in the selected critical areas with a database (temporal models stored on memory 28, see Fig1) that associates movements in selected critical areas with specific emotional (e.g. anger expression can be characterized by an initial flattening of the lip followed by a long downward curvature, followed by the mouth going back to a relax position; column 20, lines 36-40) and physical conditions.

However, Black does not teach associating movement in critical areas with physical conditions and generating a report of the emotional and physical condition of the subject. Pantic teaches a method of analyzing non-verbal communication (page 881, [p][3], lines 4-5). Pantic also teaches associating movement in critical areas (specific facial actions; page 881, [p][3], line 10) with physical conditions (physiological reaction, page 881, [p][3], line 13) and generating a report of the emotional and physical condition of the subject (Results, see Fig 1). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added the method of analyzing non-verbal communication of Pantic to the method of recognizing facial expression of Black in order to achieve a vision based gesture analysis for face

action recognition and emotional classification of facial expressions (page 903, [p][3], lines 2-5).

Note the discussion above, neither Black or Pantic teach implementing electronic speckle pattern interferometry that is a speckle-spot pattern of diffusely reflected coincident light generate an image of the face of the human subject. Reilly discloses a novel interface based on face and gesture recognition that implement electronic speckle pattern interferometry that is a speckle-spot pattern of diffusely reflected coincident light generate an image of the face of the human subject (see page 21, [p][005], where a laser based motion sensing device produces speckle pattern to generate an image). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of recognizing facial expression of Black as modified by Pantic with the novel interface of Reilly in order to achieve a non-contact gesture based system for augmentation communication that requires no accessory to be worn by the user and is not restricted to specialist software (page 21, [p][002], lines 2-6) which facilitates remote and independent detection of facial movement (page 21, [p][004], lines 7-12)

As to claim 2, Black teaches wherein the processing step comprises inputting a two-dimensional frame of the image (column 7, line 47). Black teaches scanning the image to locate the subject's face and determine it's relative position and extent (column 7, line 59). Black also teaches scanning the facial part of the image to detect the selected critical areas (column 7, line 59). Black further teaches repeating the preceding

Art Unit: 2624

steps for a sequence of image frames (column 8, lines 41-45). Additionally, Black teaches recording frame-to-frame changes (recover motion parameters; column 8, line 56) in critical areas of interest. Black further teaches recording frame-to-frame changes in critical area positions for purposes of tracking the positions while permitting limited movement of the subject (column 8, lines 59-60).

As to claim 3, Black teaches a method wherein the step of recording frame-to-frame changes in critical areas of interest includes recording changes in spot area (see column 9, line 33-43 where motion of spot area such as brow regions 45, see Fig 2, are recovered and stored in memory 20).

As to claim 5, note the discussion above, Pantic teaches wherein the comparing step makes use of a database that uses the facial action coding system (FACS) (page 901, [p][1] lines 6-7).

As to claim 6, Black teaches an apparatus for sensing selected emotions (facial gesture and recognition system; column 6, line 68 and column 7, line 1) in a human subject. Black teaches an image processing module (16, see Fig 1) for processing the image to identify movements in selected critical areas of the face; a database (temporal models are stored in memory 28) associates groups of facial movements with specific emotional (e.g. anger expression can be characterized by an initial flattening of the lip

followed by a long downward curvature, followed by the mouth going back to a relax position; column 20, lines 36-40) and physical conditions of the subject;

However, Black does not teach associating movement in critical areas with physical conditions. Pantic teaches a system for analyzing non-verbal communication (page 881, [p][3], lines 4-5). Pantic also teaches associating movement in critical areas (specific facial actions; page 881, [p][3], line 10) with physical conditions (physiological reaction, page 881, [p][3], line 13). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added the system of analyzing non-verbal communication of Pantic to the facial gesture and gesture recognition system of Black in order to achieve a vision based gesture analysis for face action recognition and emotional classification of facial expressions (page 903, [p][3], lines 2-5). Black further teaches a database analysis module (26, feature and gesture recognition detector; see Fig 1) for comparing the identified movements in the selected critical areas with the database.

Black disclose an optical imaging device (see column 7, line 44 where image acquisition system 8, see Fig 1, includes a camera), however, neither Black or Pantic teach configured to obtain a first image substantially all of the face of the human subject at a beginning of a pulse period associated with a pulsed light source, to obtain a second image of substantially all of the face of the face of the human subject at an end of the pulse period, and to subtract the second image from the first image to generate a resulting image substantially all of the face of the human subject having a high contrast. Reilly teaches an imaging device (see Fig 1) configured to obtain a first image

substantially all of the face of the human subject at a beginning of a pulse period associated with a pulsed light source, to obtain a second image of substantially all of the face of the face of the human subject at an end of the pulse period, and to subtract the second image from the first image to generate a resulting image substantially all of the face of the human subject having a high contrast ratio (see page 22, [p][004], where two image are captured and subtracted and page 21, [p][006] where two frame are used for determining motion estimation).

Therefore, thus the combination of Black and modified by Pantic with Reilly would meet the claim limitations for the same reasons as previously discussed in claim 1 above

As to claim 8, Black teaches wherein the image processing modules comprises:
the means for inputting a two-dimensional frame of the image is image acquisition system 8, see Fig 1.
the means for scanning the image to locate the subject's face and determine it's relative position and extent is image segmentation 12, see Fig1.
the means for scanning the facial part of the image to detect the critical areas of interest is image segmentation 12, see Fig1.
the means for repeating the preceding steps for a sequence of image frames is motion estimation system 16, see Fig1.
the means for recording frame-to-frame changes in the critical areas of interest is motion estimation system 16, see Fig1.

the means for recording frame-to-frame changes in critical area positions, for purposes of tracking the positions while permitting limited movement of the subject is region tracking system, 18, see Fig 1.

As to claim 9, Black teaches an apparatus wherein the means for recording frame-to-frame changes in the critical areas includes means for recording changes in area (see column 9, line 33-43 where motion of spot area such as brow regions 45, see Fig 2, are recovered and stored in memory 20).

As to claim 11, note the discussion above, Pantic teaches wherein the database uses the facial action coding system (FACS) (page 901, [p][1] lines 6-7).

As to claim 14, note the discussion above, Reilly teaches the method wherein processing the image comprises tracking the recording frame-to-frame changes in at least one of position, size and intensity of speckle-spots in the selected critical areas of the speckle-spot pattern (see page 23, [p][001], where feature tracking is done in real time).

As to claim 15, note the discussion above, Reilly teaches the method wherein generating comprises: obtaining a first image of substantially all of the face of the human subject at a beginning of a pulse period associated with a pulsed light source; obtaining a second image of substantially all of the face of the human subject at a

beginning of a pulse period associated with a pulsed light source (laser diode, see Fig 15); and subtracting the second image from the first image to generate a resulting image of substantially all of the face of the human subjects having a high contrast ratio (see page 22, [p][004], where two image are captured and subtracted and page 21, [p][006] where two frame are used for determining motion estimation).

As to claim 16, note the discussion of claim 1 above.

Claim 18 differ from claim 14 only in that claim 14 is a method claim whereas, claim 18 is an apparatus claim. Thus, claim 18 is analyzed as previously discussed with respect to claim 14 above.

3. Claims 4 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Black et al (US Patent No.: 5,774, 591) in view of Pantic (NPL document titled "Expert system for automatic analysis of facial expression") further in view of Reilly (Application of Face and Gesture Recognition for Human-Computer Interaction) further in view of Lee et al (US Patent No. 7,095,901).

As to claim 4, neither Black, Pantic nor Vining teach a method wherein the step of recording frame-to-frame changes in critical areas of interest includes recording changes in axial distance to facilitate detection of axial pulsing movements. Lee teaches a method of obtaining iris images (column 4, line 61) including the step of recording changes in axial distance (measuring the distance between a user's face and a camera;

Art Unit: 2624

column 8, line 10-11) to facilitate detection of axial pulsing movements. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added the method of obtaining iris images of Lee to the method of recognizing facial expression of Black as modified by Pantic and Reilly for measuring the distance between a user and a "camera more accurately, more conveniently and more quickly and to focus the camera automatically" (column 4, lines 2-4).

As to claim 10, neither Black, Pantic nor Reilly teach an apparatus wherein the optical imaging device includes means for measuring axial distance to a critical area of the face; and the means for recording frame-to-frame changes in critical area positions includes means for recording changes in axial distance, to facilitate detection of axial pulsing movements in a critical area. Lee teaches an apparatus for obtaining iris images (column 4, line 61) including means for measuring axial distance to a critical area of the face (703, distance measurer; Fig 12) and the means for recording frame-to-frame changes in critical area positions includes the means for recording changes in axial distance (703, distance measurer; Fig 12) , to facilitate detection of axial pulsing movements in a critical area. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added the apparatus for obtaining iris images of Lee to the facial gesture and gesture recognition system of Black as modified by Pantic and Vining for measuring the distance between a user and a "camera more accurately, more conveniently and more quickly and to focus the camera automatically" (column 4, lines 2-4).

4. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Black et al (US Patent No.: 5,774, 591) in view of Pantic (NPL document titled "Expert system for automatic analysis of facial expression") further in view of Reilly (Application of Face and Gesture Recognition for Human-Computer Interaction) further in view of Yamamoto (US Patent No.: 6,549,664).

As to claim 7, note the discussion, neither Black, Pantic nor Vining teach an apparatus wherein the optical imaging device comprises a charged-coupled device (CCD) camera producing a two-dimensional image. Yamamoto teaches a face-image processing apparatus (column 3, line 25) that comprises a charged-coupled device (CCD) camera (see Fig. 2) producing a two-dimensional image. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have substituted the optical image device of Black as modified by Pantic and Vining with the face-image processing apparatus of Yamamoto for photographing of a person's face used for extracting a certain characteristic such as an eye or nostril (column 3, lines 29-35).

Allowable Subject Matter

5. Claims 13 and 17 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Inquires

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrae S. Allison whose telephone number is (571) 270-1052. The examiner can normally be reached on Monday-Friday, 8:00 am - 5:00 +- pm, EST.

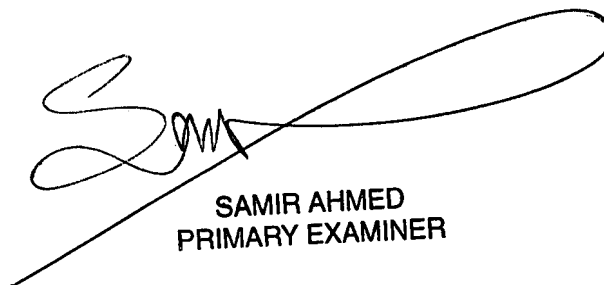
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Samir Ahmed can be reached on (571) 272-7413. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Andrae Allison

August 14, 2007

A.A



SAMIR AHMED
PRIMARY EXAMINER